**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY**
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

MAR 29 1999

REPLY TO THE ATTENTION OF:

**SR-6J**

Ms. Pat Likins
Indiana Department of Environmental Management
100 North Senata Avenue
P. O. Box 6015
Indianapolis, Indiana 46206-6015

Re: International Minerals and Chemical Corporation
Five-Year Review Report

Dear Ms Likins:

The U. S. Environmental Protection Agency (U.S. EPA) has reviewed the Five-Year Review Report dated March 1999, developed by the Indiana Department of Environmental Management for the subject site. The report is hereby approved.

U.S. EPA appreciates the efforts of Sean Grady of your staff in conducting this review. Please feel free to contact me if you have any questions.

Sincerely,

William E. Muno, Director
Superfund Division

# Five-Year Review Report

**for**

# International Minerals and Chemical Corporation (IMC) East Plant Site

## Terre Haute, Indiana

## March 1999

Prepared by:

Indiana Department of Environmental Management

for

U.S. EPA, Region V, Chicago, IL

**Five -Year Review Report**
**IMC East Plant Site, Terre Haute, Indiana**

## I. Introduction

The Indiana Department of Environmental Management (IDEM) has completed the second five-year review for the Remedial Action (RA) implemented at International Minerals and Chemical Corporation (IMC) East Plant Site, Terre Haute, Indiana. This is a statutory five-year review intended to insure that the Remedial Action (RA) remedy remains effective and protective of human health and the environment.

Section 121 of the Comprehensive Environmental Response, Compansation and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and Section 300.430 (f) (ii) of the National Oil and Hazardous Substance Contingency Plan (NCP), periodic reviews (no less than five years) are required to be conducted for sites where hazardous waste remains at the site above levels that will not allow for unlimited use or unrestricted exposure following the completion of all remedial actions for the site.

OSWER Directives 9355.7-02 (Structure and Components of Five-Year Reviews, May 23, 1991 and 9355.7-02A (Supplemental Five-Year Review Guidance, June 26, 1994) provide that the U.S. EPA will conduct five-year reviews as a matter of policy at: (1) sites where no hazardous substances will remain above levels that allow unrestricted use and unrestricted exposure after completion of the RA, but the cleanup levels specified in the Record of Decision (ROD) will require five or more years to attain; and (2) sites addressed pre-SARA at which the remedy, upon attainment of cleanup levels, will not allow unlimited use and unrestricted exposure. The five-year review of the RA at IMC East Plant Site was conducted in accordance with these directives.

U.S. EPA has established a three-tier approach to conducting five-year reviews, the (Level I Review) is the most basic of the three and provides a minimum protectiveness evalutation. U.S. EPA determines the level of review required based on site-specific considerations, including the nature of the response action, the status of on-site response activities, and the proximity to the populated areas and sensitive environmental areas. A Level I review was conducted at IMC East Plant Site in September of 1995. This is the second Level I review conducted for IMC East Plant Site, and it consisted of: (1) a review of all documents and data associated with the RA, and (2) a site visit.

The IMC East Plant Site was proposed for inclusion on the National Priority List (NPL) in October 1984, and included as final on the NPL in June 1986. A Record of Decision (ROD) was signed in June 22, 1988. The ROD specified semi-annual groundwater monitoring, maintance of the clay cap and site security, deed restrictions, and performance reviews every five years. The IMC East Plant Site was deleted from the NPL on February 11, 1991.

## II. Site History

The IMC East Plant Site is located in Vigo County, approximately 1.8 miles east of the Wabash River and one mile north of Thompsom Ditch in a semi-industrial area of Terre Haute, Indiana. The 37 acre plant site (Figure 1) is bordered on the west by the Chicago, Milwaukee, St. Paul, and Pacific Railroad and on the east by the Louisville Railroad. The disposal area encompasses approximately six acres in the northeastern portion of the plant site.

From 1946 until 1954, the Commercial Solvents Corporation (CSC) manufactured and stored benzene hexachloride (BHC), a raw material used in the production of pesticides, at the facility. There are four isomers of BHC, alpha, beta, delta and gamma. The gamma isomer (Lindane) of BHC was produced and marketed as an insecticide. Lindane is the contaminate of concern with a MCLG of 0.2 ug/L. Production of BHC at the facility ceased in 1954. Except for the warehouse, process control building, and some storage tanks, all other process equipment and buildings were partially dismantled and demolished.

## III. Results of Site Investigations

In 1975, International Minerals and Chemical Corporation (IMC) purchased the site. Beginning in 1979, IMC collected samples of soils from the East Plant facility and analyzed them for the presence of site-related contaminants. IMC also installed monitoring wells on and around the East Plant property to determine if contaminants were migrating from the site into the groundwater. The following is a summary of the waste and residue disposal investigation conducted at the IMC East Plant Site:

- In mid 1979, surficial and core samples were collected from the IMC East Plant Site from soils suspected of containing BHC. The sampling and subsequent analysis delineated the areal and vertical extent of BHC soil contamination.

- In late 1979, seven monitoring wells were installed at the site. Groundwater samples indicated the presence of measurable amounts of BHC in two of the wells.

- Following initial reconnaissance in early 1980, which included obtaining and analyzing several surficial “grab samples,” the presence of BHC residues at the site was confirmed.

In 1980, IMC contracted with Camp Dresser & McKee Inc., to advise on methods for preventing off site migration of BHC. Approximately 18,500 cubic yards of soil, rubble, piping and other debris were excavated and placed in a secure clay-capped mound (figure 2). Soil samples were collected and analyzed to assure removal of all soils containing BHC-tech in excess fo 50 parts per million (ppm). The clay capped mound was designed in accordance with guidelines of closure of hazardous waste landfills as published by U.S. EPA (43 FR 59011, December 18, 1978). The mound cap consists of a minimum of 6 inches of clay, covered by 12 inches of top common fill, and 6 inches of loam.

In 1984, chloroform was found in well B-5 (figure 2) at 7 parts per billion (ppb) on the East Plant Site by Weston-Sper (EPA TAT Contractor). Chloroform was not used in any IMC East Plant process operation. The chloroform found in well B-5 was up gradiant of the capped mound and close to the the eastern edge the IMC property. Weston-Sper concluded that the chloroform was most likely emanating from an off-site source, east of the property. The EPA TAT Contractor also concluded in 1985, that the waste mound was not adversly impacting the groundwater in the surrounding area.

Early in 1988, the Remedial Investigation/Feasibility Study (RI/FS) was completed and summarized the physical and chemial characteristics of the waste on site, including their fate and transport mechanisms. Remedial technologies were also identified.

A Record of Decision (ROD) was signed on June 22, 1988. The ROD specified semi-annual groundwater monitoring, maintance of cap and site security, deed restrictions on land use, and five year performance reviews.

## IV. Remedial Objectives

The remedial objectives for the IMC East Plant Site were to adequately protect the local residents from exposure to lindane through direct contact and to prevent further contamination of groundwater.

## V. Summary of Response Actions

### A. EXCAVATION OF BHC-CONTAMINATED SOIL

In 1980, after completion of the soil sampling plan, 18,500 cubic yards of contaminated materials were excavated, mounded, and secured by a 6 inch clay cap at the site. Excavation was carried out in all areas until soil samples contained less than 50 ppm BHC.

The areas from which contaminated soil was taken were graded, seeded and fertilized. The clay mound was covered with one foot of common fill with an additoinal six inches of seeded loam. The mound was encircled with a concrete drainage ditch which diverts direct surface run-off away from the edge of the mound toward a gravel infiltration area (Figure 2 ) to the south.

The fence and capping system serve to protect human health by preventing direct contact with the contaminated soils. In addition, the installed clay cap prevents rainfall from infiltrating through the contaminated soils, thereby protecting the groundwater from further contamination.

### B. GROUNDWATER MONITORING

The monitorting program consists of up gradiant (PW-l, B-l, & B-2) and down gradient (B-9, B-10, & B-11) groundwater sampling points (Figure 2) which will help give early warning of a possible cap failure. In addition, the monitoring program provides a reliable means of data gathering for additional protection. Groundwater has been tested on a quarterly basis for lindane

(BHC-gamma isomer). During the RI, lindane was detected (below its MCLG of 0.2 ug/L) in the ground water samples at monitoring wells B-9 and B-10 at concentrations of 0.029 ppb and 0.043 to 0.05 ppb, respectively. The concentrations of lindane in the groundwater have been steadily decreasing since 1980.

C. PREVIOUS FIVE-YEAR REVIEW

In July of 1995, an inspection was conducted and it was determined that the clay cap, fencing, and groundwater monitoring program remained operational and functional. Groundwater samples were collected from well B-9 which indicated the peresence of the beta isomer of BHC. Lindane and the other isomers of BHC were not detected in well B-9. Well B-9 was the only well sampled. During that inspection, lindane was not detected in groundwater samples, however the only well evaluated was B-9, confirming the previous data that the levels of lindane are declining and are below the MCLG (see figure 3). It was concluded that the remedy is protective of the public health and environment.

In September of 1997, the new point of contact for the former IMC East Plant Site, now the Solid Waste Containment Area at the Mallinckrodt Veterinary, Inc. changed to:

Kathryn Zeigler
Environmental Remediation Manager
Mallinckrodt Inc.
16305 Swingley Ridge Road
Chesterfield, MO 63017
(314) 654-6347

## VI. SUMMARY OF SITE VISIT AND RECOMMENDATIONS

The IMC East Plant Site was visited on December 30,1998, by IDEM's project managers. The purpose of the site visit was to determine the protectiveness of the clay cap and the monitoring system. Based on the inspection, it appears that the clay cap was intact and the vegatation growing on top of the mound was healthy. Also, the fencing and grondwater monitoring program remain operational and functional. All of the groundwater wells were capped and locked and appeared intact.

An analysis of the groundwater data, received from Mallinckrodt Veterinary Inc., showed that lindane is decreasing in wells B-9 and B-10, actually below detection limits of analytical methods. However, there was a detection of lindane in well B-1l of 0.06 ppb (see figure 3). Although this is below the MCLG for lindane, futher monitoring of lindane should be conducted to further monitor its migration. Lindane previously did not show up in well B-11.

Other isomers of BHC were present in groundwater samples of well B-9, B-10 & B-11 (Figure 3). The alpha, beta, and delta isomers were detected at very low levels and none of these isomers have MCL's.

IDEM recommends that the O&M and groundwater monitoring continue. The existing fence, cap, and drainage system will protect the public from direct contact with contaminated materials and reduce the migration fo contaminants off-site through rain water infiltration and groundwater recharge.

## VII. STATEMENT OF PROTECTIVENESS

I certify that the remedies selected for this site remain protective of the public health and environment.

## VII. NEXT REVIEW

Hazardous substances, pollutants and contaminants will remain at the IMC East Plant Site, (Solid Waste Containment Area at Mallinckrodt Veterinary Inc.), which will not allow for unlimited use or unrestricted exposure. IDEM will conduct another Five-Year Review by June 30, 2003. This review will be a Level I Review, consisting of a review of all groundwater monitoring data, a site inspection, and review of newly promulgated environmental laws.

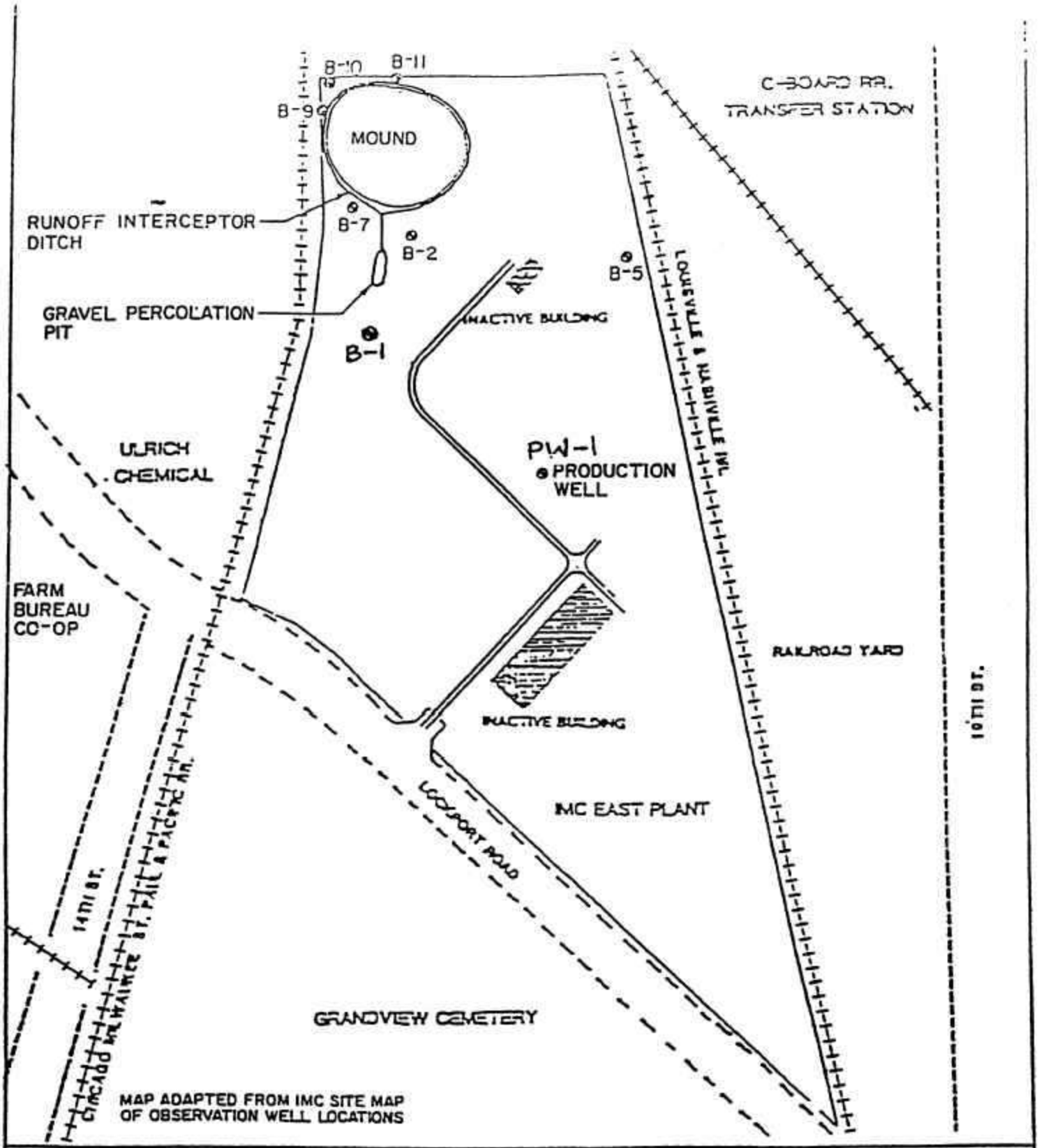


FIGURE 2

SITE MAP

IMC EAST PLANT
TERRE HAUTE, IN

100 0 100 200 300

APPROX. SCALE IN FT.

WELL LOCATIONS

N

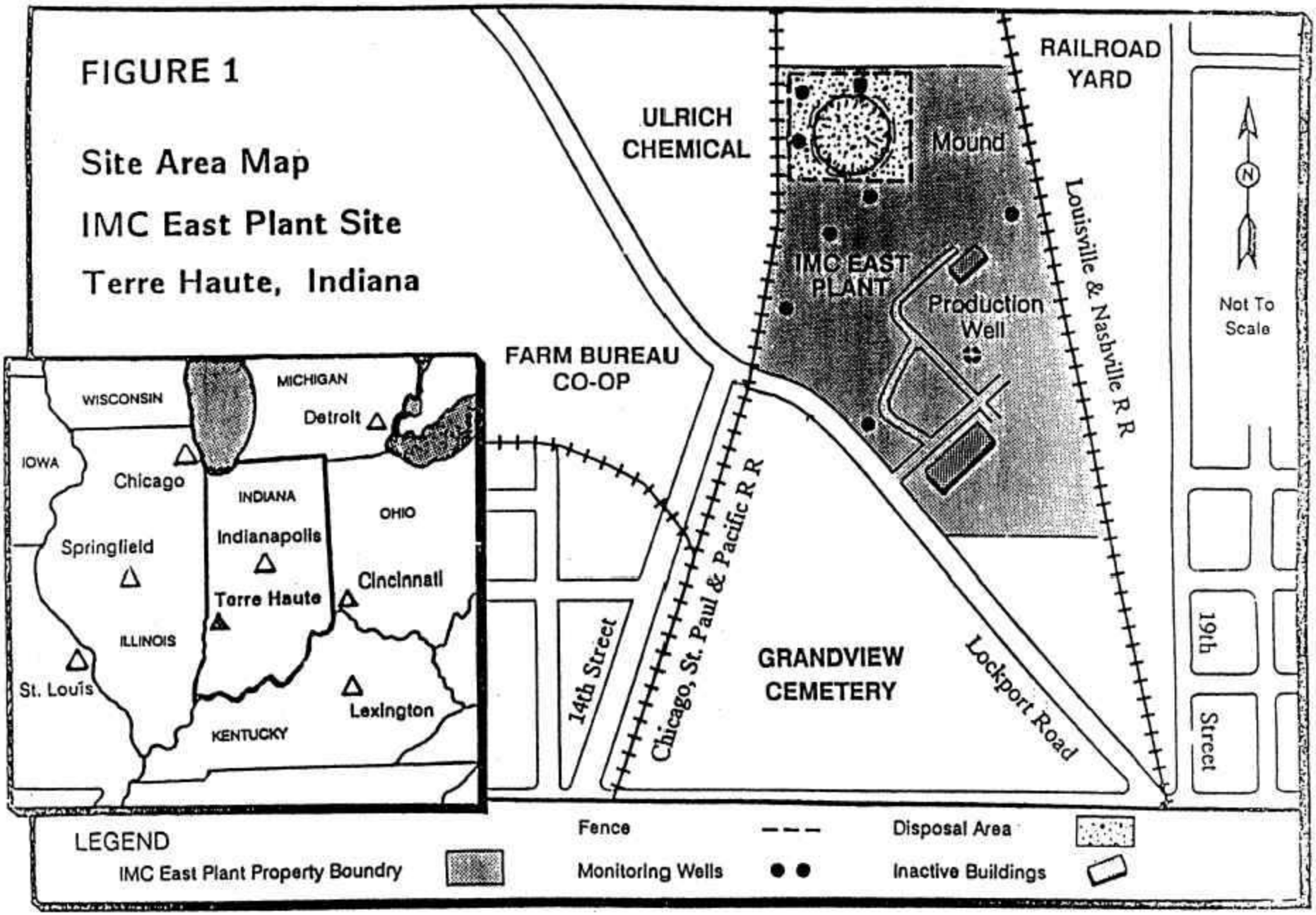
FIGURE 1
Site Area Map
IMC East Plant Site
Terre Haute, Indiana
ULRICH CHEMICAL
RAILROAD YARD
Mound
IMC EAST PLANT
Production Well
Louisville & Nashville R R
Not To Scale
FARM BUREAU CO-OP
Chicago, St. Paul & Pacific R R
14th Street
GRANDVIEW CEMETERY
Lockport Road
19th Street
WISCONSIN
MICHIGAN
Detroit
IOWA
Chicago
INDIANA
OHIO
Springfield
Indianapolis
Cincinnati
Terre Haute
ILLINOIS
St. Louis
Lexington
KENTUCKY
LEGEND
IMC East Plant Property Boundry
Fence
Monitoring Wells
Disposal Area
Inactive Buildings

## Figure 3

**IMC's**
Ground Water Monitoring Data
for Superfund Site: IN1900108976

**Alpha-BHC**

| Date | Well MW-1 | Well MW-2 | Well MW-9 | Well MW-10 | Well MW-11 | Well PW-1 |
|---|---|---|---|---|---|---|
| 11-Jan-95 | BDL | BDL | BDL | BDL | BDL | BDL |
| 20-Jun-95 | BDL | BDL | BDL | BDL | BDL | BDL |
| 12-Dec-95 | BDL | BDL | est. 0.024 | est. 0.023 | BDL | BDL |
| 26-Jun-96 | BDL | BDL | BDL | BDL | BDL | BDL |
| 18-Dec-96 | BDL | BDL | BDL | BDL | BDL | BDL |
| 18-Jun-97 | BDL | BDL | BDL | BDL | BDL | BDL |
| 19-Dec-97 | BDL | BDL | 0.170 | 0.140 | 0.099 | BDL |
| 19-Jun-98 | BDL | BDL | BDL | BDL | BDL | BDL |

**Beta-BHC**

| Date | Well MW-1 | Well MW-2 | Well MW-9 | Well MW-10 | Well MW-11 | Well PW-1 |
|---|---|---|---|---|---|---|
| 11-Jan-95 | BDL | BDL | 0.160 | 0.180 | BDL | BDL |
| 20-Jun-95 | BDL | BDL | 0.160 | 0.130 | BDL | BDL |
| 12-Dec-95 | BDL | BDL | 0.120 | 0.160 | BDL | BDL |
| 26-Jun-96 | BDL | BDL | 0.140 | 0.150 | BDL | BDL |
| 18-Dec-96 | BDL | BDL | 0.190 | 0.200 | BDL | BDL |
| 18-Jun-97 | BDL | BDL | BDL | BDL | BDL | BDL |
| 19-Dec-97 | BDL | BDL | 0.210 | 0.210 | 0.200 | BDL |
| 19-Jun-98 | BDL | BDL | 0.200 | 0.180 | BDL | BDL |

**Delta-BHC**

| Date | Well MW-1 | Well MW-2 | Well MW-9 | Well MW-10 | Well MW-11 | Well PW-1 |
|---|---|---|---|---|---|---|
| 11-Jan-95 | BDL | BDL | BDL | 0.100 | BDL | BDL |
| 20-Jun-95 | BDL | BDL | BDL | 0.110 | BDL | BDL |
| 12-Dec-95 | BDL | BDL | est. 0.084 | est. 0.032 | BDL | BDL |
| 26-Jun-96 | BDL | BDL | BDL | 0.063 | BDL | BDL |
| 18-Dec-96 | BDL | BDL | BDL | 0.089 | BDL | BDL |
| 18-Jun-97 | BDL | BDL | BDL | 0.090 | BDL | BDL |
| 19-Dec-97 | BDL | BDL | BDL | 0.100 | 0.054 | BDL |
| 19-Jun-98 | BDL | BDL | BDL | 0.099 | BDL | BDL |

**Gamma-BHC**

| Date | Well MW-1 | Well MW-2 | Well MW-9 | Well MW-10 | Well MW-11 | Well PW-1 |
|---|---|---|---|---|---|---|
| 11-Jan-95 | BDL | BDL | BDL | BDL | BDL | BDL |
| 20-Jun-95 | BDL | BDL | BDL | BDL | BDL | BDL |
| 12-Dec-95 | BDL | BDL | BDL | BDL | BDL | BDL |
| 26-Jun-96 | BDL | BDL | BDL | BDL | BDL | BDL |
| 18-Dec-96 | BDL | BDL | BDL | BDL | BDL | BDL |
| 18-Jun-97 | BDL | BDL | BDL | BDL | BDL | BDL |
| 19-Dec-97 | BDL | BDL | BDL | BDL | 0.060 | BDL |
| 19-Jun-98 | BDL | BDL | BDL | BDL | BDL | BDL |

Key:
BDL= Below Detection Limit
est.= Estimated
Units: ug/L
(Lindane ) Gamma-BHC's MCL for Groundwater = 0.2 ug/L